AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A control loop circuit for optimizing an output of a power supply ~~output~~ under varying load conditions, ~~the power supply having a main loop amplifier and an output stage to generate the output,~~ the control loop circuit comprising ~~including~~:

a first control path coupled to the output of the power supply, ~~output and having~~ the first control path including an error amplifier having an output, the error amplifier operative to generate an error signal ~~for presentation~~ to ~~the~~ a main loop amplifier, the error signal representing the difference between a desired output and a sensed output; and

a second control path coupled to the output of the error amplifier ~~output~~ and responsive to the error signal to generate a dynamic compensation signal, the second control path comprising:

input conversion circuitry for converting the error signal into a digital signal,

a digital-signal-processor coupled to the input conversion circuitry;

a look-up table for storing optimal compensation signal responses to detected error signals, the digital-signal-processor operative in response to the digitized error

signal to access the look-up table and identify the optimal compensation signal, and generating the optimal signal; and

output conversion circuitry for ~~feeding~~ connecting the optimal signal to the main loop amplifier output.

2. (Cancelled)

3. (Previously Amended) A control loop circuit according to claim 1 wherein:

the look-up table comprises a RAM memory.

4. (Previously Amended) A control loop circuit according to claim 1 wherein the second control path is disposed in parallel with the first control path.

5. (Previously Amended) A control loop circuit according to claim 1 wherein:

the second control path is selectively activated when the error signal is greater than a predetermined threshold.

6. (Previously Amended) A control loop circuit according to claim 1 wherein:

the output conversion circuitry comprises a digital-to-analog converter.

7. (Previously Amended) A control loop circuit according to claim 1 wherein:

the first control path includes respective source and sink signal paths; and

the output conversion circuitry comprises respective source and sink digital-to-analog converters coupled to the respective source and sink signal paths.

8. (Currently Amended) A control loop circuit ~~for controlling the loaded output of a DUT power supply, the DUT power supply including an input, a main loop amplifier and an output stage amplifier, the control system~~ comprising ~~including~~:

a main loop amplifier having an input and an output;

an output stage amplifier having an input and an output, the output of the main loop amplifier connecting to the input of the output stage amplifier, the output of the output stage amplifier connecting to a variable load;

a compensation means for compensating an error signal~~, the means for compensating coupled between the input and output of the power supply~~; and

a dynamic compensation control loop including a digital-signal-processor, the dynamic compensation control loop connecting the output of the main loop amplifier to the input of the main loop amplifier ~~disposed in parallel with the means for compensating~~, the compensation means connecting the output of the output stage amplifier to the dynamic compensation loop, the dynamic compensation control loop selectively cooperating with the compensation means ~~for compensating~~ to optimize the output of the ~~power supply~~ output stage amplifier in response to the variable load ~~varying output loads~~.

9. (Currently Amended) A control loop circuit according to claim 8 wherein~~:~~ the compensation means ~~for compensating an error signal~~ comprises ~~a first control path including~~ an ~~error amplifier, the~~ error amplifier operative to generate an error signal ~~for presentation~~ to the main loop amplifier.

10. (Currently Amended) A power supply system including:

a main loop amplifier circuit;

an output stage disposed in cascade with the main loop amplifier circuit; and

a control loop circuit, the control loop circuit including

a first control path coupled to the output stage and having an error amplifier, the error amplifier operative to generate an error signal ~~for presentation~~ to the main loop amplifier, the error signal representing the difference between a desired output and a sensed output; and

a second control path coupled to the error amplifier output and responsive to the error signal to generate a dynamic compensation signal, the second control path comprising:

input conversion circuitry for converting the error signal into a digital signal,

a digital-signal-processor coupled to the conversion circuitry;

a look-up table for storing optimal compensation signal responses to detected error signals, the digital-signal-processor operative in response to the digitized error signal to access the look-up table and identify the optimal compensation signal, and generating the optimal signal; and

output conversion circuitry for ~~feeding~~ connecting the optimal signal to the main loop amplifier output.

11. (Cancelled)

12. (Previously Amended) A power supply system according to claim 10 wherein: the look-up table comprises a RAM memory.

13. (Previously Amended) A power supply system according to claim 10 wherein the second control path is disposed in parallel with the first control path.

14. (Previously Amended) A power supply system according to claim 10 wherein: the second control path is selectively activated when the error signal is greater than a predetermined threshold.

15. (Previously Amended) A power supply system according to claim 10 wherein: the output conversion circuitry comprises a digital-to-analog converter.

16. (Previously Amended) A power supply system according to claim 10 wherein: the first control path includes respective source and sink signal paths; and

the output conversion circuitry comprises respective source and sink digital-to-analog converters coupled to the respective source and sink signal paths.

17. (Currently Amended) A method of controlling the output of a device under test (DUT) ~~DUT~~ power supply, the method comprising ~~including the steps of~~:

generating a first compensated error signal based on the difference between ~~the~~ a desired power supply output and ~~the~~ an actual power supply output;

producing a dynamically compensated error signal in parallel with the first compensated error signal, ~~the~~ producing ~~step further~~ comprising:

converting the first compensated error signal into a digital signal;

analyzing the digital signal;

~~creating~~ generating a digital dynamically compensated error signal based on the analyzing the digital signal ~~step~~;

converting the digital dynamically compensated error signal to an analog dynamically compensated error signal; and

summing the first compensated error signal and the analog dynamically compensated error signals to ~~create~~ generate an optimal compensation signal.

18. (Currently Amended) A method according to claim 17 wherein ~~the~~ producing ~~step is~~ comprises being dependent on the magnitude of the first compensated error signal being above a pre-set threshold.

19. (Cancelled)